

This first investigated Asiatic species proves to be of great interest, as the following summary of results will show. The prothallium is exceedingly variable in its early stages, and of special interest is the occasional occurrence of a "primary tubercle" comparable to that of *Lycopodium cernuum*. The lobes of the prothallium are always erect and very close together, both in nature and in a darkened room, so that this upright position holds no relation to the amount of light. One of the striking features of the prothallium is its radial symmetry, which disposes of the claim that the fundamental difference between the prothallium of *Lycopodium* and of *Equisetum* is that the latter is not radial, but dorsiventral. The prothallium of this species also proves to be much larger than the largest that have yet been found in the genus. There are no male prothallia, but sometimes prothallia do not produce antheridia, and therefore are female. The antheridia resemble those of *Lycopodium* in position, general structure, and paraphyses. The archegonium has a single neck canal cell, which is also a feature of resemblance to *Lycopodium cernuum*. The author reaches the general conclusion that there is a clear affinity with the prothallium of *Lycopodium cernuum*, and that there is no more difference between the two prothallia than is already known to occur among the species of *Lycopodium*.—J. M. C.

The embryogeny of Balanophora.—The researches of TREUB and LOTSY on the embryogeny of the Balanophoraceae are well known. In *Balanophora* they found the four nuclei in the antipodal end of the sac, and also the synergids and egg degenerating as soon as the sac reached the fertilization stage; the remaining micropylar polar nucleus gave rise to a cellular endosperm, from one of whose cells the embryo developed.

ERNST'S studies on the embryogeny of saprophytic forms led him to suspect that there might be a simpler explanation of the origin of the embryo of *Balanophora*. A reinvestigation¹⁶ confirmed the previous accounts of the origin and development of the embryo sac, the degeneration of the antipodals and the synergids, and the formation of a cellular endosperm from the micropylar antipodal; but it also showed that the embryo is developed from the egg. The development, however, begins late, after the egg is surrounded by cellular endosperm, and it was this behavior which misled both TREUB and LOTSY. There is no fertilization in either *Balanophora globosa* or *B. elongata*. Both are parthenogenetic. The development of the sac shows the diploid number of chromosomes.—CHARLES J. CHAMBERLAIN.

Experimentation in plant geography.—MASSART¹⁷ has given emphasis to the fact that plant geography has hardly kept abreast of other branches of

¹⁶ ERNST, A., Embryobildung bei *Balanophora*. *Flora* 106:129-158. pls. 1, 2. 1913.

¹⁷ MASSART, J., Le rôle de l'expérimentation en géographie botanique. *Rec. Instit. Bot. Léo Errera* 9:68-90. 1913.